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Magneto-structural study of phase pure α and β type MnAs nanoparticles P. KHAREL, KEERTHI SENEVIRATHNE, RON TACKETT, STEPHANIE BROCK, G. LAWES, Wayne State University — There is extensive interest in understanding the properties of nanoscale materials that exhibit magneto-structural phase transitions because of their possible use in magnetocaloric applications. Bulk MnAs exhibits a ferromagnetic transition in the range 313-317 K, together with a structural transition from a hexagonal (α -MnAs) to an orthorhombic (β -MnAs) lattice. We have studied the structural and magnetic properties of α -MnAs and β -MnAs nanoparticles synthesized using solution-phase arrested precipitation method. XRD and TEM studies show that both the α and β phase nanoparticles are crystalline, phase pure, and stable for weeks at room temperature. Magnetic measurements show that both the α -MnAs and β -MnAs phase nanoparticles undergo ferromagnetic phase transitions near 315K, but we find no evidence for the associated α to β structural transition seen in bulk MnAs. We will present an experimental investigation on the connection between structural and magnetic properties in α and β type MnAs nanoparticles, and discuss relevance to studies on other nanostructured systems.

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